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(FILE 'HOME' ENTERED AT 08:56:15 ON 17 JUN 2007)

FILE 'CA' ENTERED AT 08:56:23 ON 17 JUN 2007

L1 38 S SECARS OR (SE OR SURFACE(1A)ENHANC?) (2A) (ANTISTOKES OR ANTI STOKES
OR CARS)
L2 44 S (MICROFLUIDI? OR CAPILLARY) (8A) ((SE OR SURFACE(1A)ENHANC?) (2A) RAMAN
OR SERS OR SERRS)
L3 35 S L1-2 AND PY<2004

=> d bib,ab,kwic 13 1-35

L3 ANSWER 4 OF 35 CA COPYRIGHT 2007 ACS on STN
AN 138:334033 CA
TI Microfluidic SE(R)S detection
IN Smith, William Ewen; Graham, Duncan; Cooper, Jonathan Mark; Keir, Ruth;
Igata, Eishi
PA University of Strathclyde, UK; The University Court of the University of
Glasgow
SO PCT Int. Appl., 59 pp.
PI WO 2003038436 A2 20030508 WO 2002-GB5025 20021104
US 2005042615 A1 20050224 US 2004-494168 20040929
PRAI GB 2001-26319 A 20011102
AB The present invention relates to a microfluidic method of generating in
situ a colloid for use in detecting an analyte using for example SER(R)
S, as well as a method of detecting an analyte using SER(R)S in a
microfluidic system. The invention also relates to microfluidic devices
for use in detecting analytes such as by way of SER(R)S signals.

L3 ANSWER 8 OF 35 CA COPYRIGHT 2007 ACS on STN
AN 136:193349 CA
TI **SERRS**. In Situ Substrate Formation and Improved Detection Using
Microfluidics
AU Keir, Ruth; Igata, Eishi; Arundell, Martin; Smith, W. Ewen; Graham,
Duncan; McHugh, Callum; Cooper, Jonathan M.
CS Department Pure and Applied Chemistry, University of Strathclyde,
Glasgow, G1 1XL, UK
SO Analytical Chemistry (2002), 74(7), 1503-1508
AB Surface-enhanced resonance Raman scattering (SERRS) of a model deriv. of
TNT was detected using a microflow cell designed within the framework of
the lab-on-a-chip concept, using only the analyte and readily available
reagents. The SERRS substrate, silver colloid, was prepd. in situ, on-
chip, by borohydride redn. of silver nitrate. The silver colloid was
imaged within the chip using a white light microscope in either
transmission or, due to the high reflectivity of the colloid, reflection
mode. A fine stream of colloid $\square 30 \mu\text{m}$ in width was formed in a 250- μm -
wide channel at the point where the colloid prepn. reagents met. The
chip was designed to produce a concd. stream of colloid within a laminar
regime, such that particles did not readily disperse into the fluid.
One result of this was to reduce the effective vol. of anal. Attempts
to deliberately disrupt this stream with microstructured pillars,
fabricated in the fluidic channels, were unsuccessful. The chip was
also designed to have the appropriate dimensions for detection using a
modern Raman microscope system, which collects scattering from a very

small vol. A dye derived from TNT was used as a model analyte. Quant. behavior was obtained over 4 orders of magnitude with a detection limit of 10 fmol. This performance is 1-2 orders of magnitude better than that achieved using a macroflow SERRS cell. The technique has the added advantage that both reagent consumption and effluent prodn. are greatly reduced, leading to reduced operating costs and a decreased environmental impact.

L3 ANSWER 10 OF 35 CA COPYRIGHT 2007 ACS on STN

AN 134:277625 CA

TI Novel surface enhanced Raman scattering (SERS)-active substrates and method for interfacing Raman spectroscopy with capillary electrophoresis (CE)

IN Natan, Michael J.; He, Lin

PA The Penn State Research Foundation, USA

SO PCT Int. Appl., 33 pp.

PI WO 2001025757 A1 20010412 WO 2000-US27667 20001006

PRAI US 1999-157958P P 19991006

US 1999-168936P P 19991203

US 1999-169339P P 19991206

WO 2000-US27667 W 20001006

AB The invention provides novel Surface Enhanced Raman Scattering (SERS)-active substrates for Raman spectroscopy that provide more SERS-enhancement and reproducibility than prior art substrates. The invention also provides a novel interface between capillary electrophoresis (CE) and Raman spectroscopy. SERS data from CE sepn. of tyrosine and tryptophan are shown.

L3 ANSWER 11 OF 35 CA COPYRIGHT 2007 ACS on STN

AN 133:260895 CA

TI **Surface-enhanced Raman** scattering: A structure-specific detection method for **capillary** electrophoresis

AU He, Lin; Natan, Michael J.; Keating, Christine D.

CS Department of Chemistry, Pennsylvania State University, University Park, PA, 16802-6300, USA

SO Analytical Chemistry (2000), 72(21), 5348-5355

AB A new approach to detecting capillary electrophoresis (CE) eluent components by interfacing CE with a surface-enhanced Raman scattering (SERS) system is described. In this approach, CE-based sepn. of a mixt. of trans-1,2-bis(4-pyridyl)ethylene and N,N-dimethyl-4-nitrosoaniline was detected by SERS in a postcolumn geometry. The retention time obtained from SERS corresponds well with that from conventional UV-visible detection. Meanwhile, CE eluants are identified by their characteristic vibrational spectra, demonstrating the validity of SERS as a structure-specific detection method for CE. The ability to monitor SERS intensity changes at mol.-specific frequencies makes selective detection of individual analytes possible, even when sepn. is incomplete. Finally, CE-SERS is evaluated for sepn. of amino acids (tyrosine and tryptophan) and environmental pollutants (chlorophenol mixts.).

L3 ANSWER 14 OF 35 CA COPYRIGHT 2007 ACS on STN

AN 132:245599 CA

TI On-column **surface-enhanced Raman** spectroscopy detection in **capillary**

electrophoresis using running buffers containing silver colloidal solutions

AU Nirode, William F.; Devault, Gerald L.; Sepaniak, Michael J.; Cole, Roderic O.

CS Department of Chemistry, University of Tennessee, Knoxville, TN, 37996-1600, USA

SO Analytical Chemistry (2000), 72(8), 1866-1871

AB Direct on-column **surface-enhanced Raman** spectroscopy (**SERS**) detection is demonstrated in **capillary** electrophoresis (CE). Distinctive SERS spectra of two test compds., riboflavin and Rhodamine 6G, were obtained in 100 µm internal diam. fused-silica capillaries under CE conditions using running buffers that contain silver colloidal solns. Detection was performed using an unmodified com. Raman spectrometer in a confocal microscope mode of operation. The effects of laser power, wavelength, spectra acquisition time, silver colloidal concn., and applied voltage (i.e., flow rate) on the quality of SERS spectra are evaluated. Using laser powers of 17 mW (at the sample) at 515 nm and employing 1 s spectral acquisition times, spectra with bands exhibiting signal-to-noise ratios >10 could be obtained for 1.0×10^{-6} M riboflavin and very low nanomolar concns. of Rhodamine 6G. This was accomplished without optimization of silver colloidal soln. compns. and by using a low-throughput spectrometer. Incorporation of the colloidal solns. into running buffers has little effect on the sepn. of the test compds. as monitored using a laser-induced fluorescence instrumental scheme. However, **SERS** spectra degrade if the **capillary** is not rinsed between expts. Riboflavin and Rhodamine 6G spectra were obtained on-the-fly for actual CE sepns. In the case of the latter solute, the injected quantity was □90 amol.

L3 ANSWER 25 OF 35 CA COPYRIGHT 2007 ACS on STN

AN 117:56702 CA

TI **Surface-enhanced Raman** spectroscopy using a silver-coated **capillary** substrate

AU Li, Y. S.; Lee, Arthur S.

CS Dep. Chem., Memphis State Univ., Memphis, TN, 38152, USA

SO Proceedings of SPIE-The International Society for Optical Engineering (1992), 1636(Appl. Spectrosc. Mater. Sci. II), 129-37

AB A Ag-coated capillary substrate was prepd. by chem. redn. of Ag ions. Its performance as a surface-enhanced Raman scattering (SERS) active substrate is compared with those of chem. prepd. Ag/glass and of Ag islands by using p-chlorobenzoic acid (PCBA) as an analyte. The adsorption behavior of PCBA on or near the surface of Ag films was characterized partially. The dependence of SERS intensity on the pH and the concn. of the analyte soln. may be interpreted on the basis of a chem. enhancement mechanism.

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STN INTERNATIONAL LOGOFF AT 09:02:10 ON 17 JUN 2007

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(FILE 'HOME' ENTERED AT 16:30:49 ON 16 JUN 2007)
FILE 'CA' ENTERED AT 16:30:59 ON 16 JUN 2007
L1 42723 S SURFACE(1A)ENHANC?(5A)RAMAN OR SER
L2 4582 S (ANTISTOKES OR ANTI STOKES OR CAR) AND RAMAN
L3 95 S L1 AND L2
FILE 'MEDLINE' ENTERED AT 16:35:32 ON 16 JUN 2007
L4 14 S L3
FILE 'BIOSIS' ENTERED AT 16:35:46 ON 16 JUN 2007
L5 2 S L3
FILE 'INSPHYS' ENTERED AT 16:36:02 ON 16 JUN 2007
L6 2 S L3
FILE 'INSPEC' ENTERED AT 16:36:28 ON 16 JUN 2007
L7 47 S L3
FILE 'CA, MEDLINE, BIOSIS, INSPHYS, INSPEC' ENTERED AT 16:37:06 ON 16 JUN 2007
L8 114 DUP REM L3 L4 L5 L6 L7 (46 DUPLICATES REMOVED)

=> d bib,ab,kwic 1-114

L8 ANSWER 26 OF 114 CA COPYRIGHT 2007 ACS on STN
AN 142:478364 CA
TI Method and device for detecting small numbers of molecules using
surface-enhanced coherent **anti-stokes Raman** spectroscopy
IN Koo, Tae-Woong; Gerth, Christopher M.; Yamakawa, Mineo
PA USA
SO U.S. Pat. Appl. Publ., 24 pp., Cont.-in-part of U.S. Ser. No. 688,680.
PI US 2005110990 A1 20050526 US 2004-966893 20041015
US 2005084980 A1 20050421 US 2003-688680 20031017
WO 2005038419 A2 20050428 WO 2004-US34598 20041018
PRAI US 2003-688680 A2 20031017
US 2004-966893 A 20041015
AB The device and method disclosed herein concern detecting, identifying,
and or quantifying analytes, such as nucleic acids, with high resoln.
and fast response times using **surface enhanced** coherent **anti-Stokes**
Raman spectroscopy. In certain embodiments of the invention, a small
no. mol. sample of the analyte such as a nucleotide, passes through a
microfluidic channel, microchannel, or nanochannel and sample cell that
contains **Raman**-active surfaces, and is detected by **surface enhanced**,
coherent **anti-Stokes Raman** spectroscopy (SECARS). Other embodiments of
the invention concern an app. for analyte detection.

L8 ANSWER 56 OF 114 CA COPYRIGHT 2007 ACS on STN
AN 140:50020 CA
TI Metal coated nanocrystalline silicon as active **surface enhanced Raman**
spectroscopy substrate
IN Chan, Selena; Berlin, Andrew A.; Yamakawa, Mineo
PA Intel Corporation, USA
SO U.S. Pat. Appl. Publ., 13 pp.
PI US 2003231304 A1 20031218 US 2002-171357 20020612
US 6970239 B2 20051129
US 2004135997 A1 20040715 US 2003-680583 20031007
US 6989897 B2 20060124

	US 2006215154	A1	20060928	US 2005-264433	20051031
PRAI	US 2002-171357	A	20020612		
	US 2003-368976	A2	20030218		
	US 2003-680583	A2	20031007		

AB **Raman** spectroscopy of amino acids or proteins can be improved by using metal coated nanocryst. porous silicon substrates. The porous silicon substrates may be formed by anodic etching in dil. hydrofluoric acid. A thin coating of a **Raman** active metal (such as gold or silver) may be coated onto the porous silicon by cathodic electromigration or any known technique. The metal-coated substrates provide an extensive, metal rich environment for **SERS**, **SERRS**, **hyper-Raman** and/or **CARS Raman** spectroscopy. Metal nanoparticles may be added to the metal-coated substrate to further enhance the **Raman** signals.

L8 ANSWER 74 OF 114 CA COPYRIGHT 2007 ACS on STN
AN 133:184846 CA

TI Can **surface-enhanced Raman** scattering serve as a channel for strong optical pumping?

AU Haslett, T. L.; Tay, L.; Moskovits, M.

CS Department of Chemistry, Photonics Research Ontario, University of Toronto, Toronto, M5S 1A1, Can.

SO Journal of Chemical Physics (2000), 113(4), 1641-1646

AB The **surface-enhanced Raman** scattering spectra of a no. of dye and colorless mols. adsorbed on deposited colloidal Ag films were systematically studied as a function of power and position using a **Raman** microscope. The **anti-Stokes** portions of the spectra of the dyes reproducibly show line intensities much greater than what is expected from the equil. population of the excited vibrational states, even at the lowest incident light intensities used. This behavior was obsd. previously and attributed to optical pumping of vibrationally excited states of the mols. by unusually intense **surface-enhanced Raman** transitions, [Phys. Rev. Lett. 76, 2444(1996)] suggesting either uncommonly large **Raman** cross sections or very intense local field strengths exceeding those encountered in the most powerful currently available lasers. Based on this work, however, the authors ascribe the apparently large **anti-Stokes** intensities primarily to a difference in the Stokes and **anti-Stokes Raman** cross sections resulting from resonance or pre-resonance **Raman** processes in the adsorbate-surface complex rather than to strongly nonequil. populations in the mol. vibrational states. Finally, the authors obsd. no significant inhomogeneity in the **Raman** enhancement in the images of the deposited Ag colloid samples down to spatial resols. of $\square 1 \mu\text{m}$.

L8 ANSWER 77 OF 114 CA COPYRIGHT 2007 ACS on STN
AN 133:263366 CA

TI Near-infrared **surface-enhanced Raman** spectroscopy of biomedically relevant single molecules on colloidal silver and gold clusters

AU Kneipp, Katrin D.; Kneipp, Harald; Itzkan, Irving; Dasari, Ramachandra R.; Feld, Michael S.

CS G. R. Harrison Spectroscopy Lab., Massachusetts Institute of Technology, Cambridge, MA, USA

SO Proceedings of SPIE-The International Society for Optical Engineering (2000), 3922(Scanning and Force Microscopies for Biomedical Applications

II), 49-55

AB **Surface-enhanced Raman** scattering (**SERS**) is a phenomenon resulting in strongly increased **Raman** signals from mols. which have been attached to nanometer sized metallic structures. The technique combines fingerprint capabilities of vibrational spectroscopy and ultra sensitive detection limits. Silver or gold colloidal clusters can provide total enhancement factors of about 14 orders of magnitude for non- resonant **Raman** scattering at near IR excitation. Since non-resonant near IR photons are used, photodecompn. of the probed mol. is avoided or, at least strongly reduced, and relatively high excitation intensities can be applied. In addn. to the Stokes **Raman** signal, that linearly depends on excitation laser intensity, at excitation intensities higher than approx. 105-106 W/cm² and 107 W/cm², 'pumped' **anti-Stokes Raman** scattering and **surface enhanced** hyper **Raman** scattering, resp., can be obsd. Both effects can provide a non-linear or two-photon **Raman** probe where the **Raman** scattering signal depends quadratically on the excitation laser intensity.

L8 ANSWER 79 OF 114 CA COPYRIGHT 2007 ACS on STN

AN 131:264050 CA

TI **Surface-enhanced** non-linear **Raman** scattering at the single-molecule level

AU Kneipp, Katrin; Kneipp, Harald; Itzkan, Irving; Dasari, Ramachandra R.; Feld, Michael S.

CS G.R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge, MA, USA

SO Chemical Physics (1999), 247(1), 155-162

AB **Surface-enhanced** hyper-**Raman** scattering and **surface-enhanced anti-Stokes Raman** scattering were studied as potential tools for nonlinear single-mol. **Raman** spectroscopy. Expts. were performed using near-IR excitation on crystal violet adsorbed on colloidal Ag or Au clusters. Strong enhancement factors $\sim 10^{20}$ were inferred from hyper-**Raman** scattering expts. on colloidal Ag. Such extremely high enhancement factors overcome the inherently weak nature of the effect, and **surface-enhanced** hyper-**Raman** scattering appears on comparable intensity levels as **surface-enhanced Raman** scattering. **Surface-enhanced anti-Stokes Raman** scattering starts from vibrational levels, that are populated by the very strong **surface-enhanced Raman** process. Thus, the **anti-Stokes Raman** scattering signal depends quadratically on the excitation laser intensity. For the 1st time, **surface-enhanced anti-Stokes** and Stokes **Raman** scattering was detected from single mols. on colloidal Au clusters.

L8 ANSWER 80 OF 114 CA COPYRIGHT 2007 ACS on STN

AN 129:237071 CA

TI Near-infrared **surface-enhanced Raman** scattering can detect single molecules and observe "hot" vibrational transitions

AU Kneipp, Katrin; Kneipp, Harald; Manoharan, Ramasamy; Itzkan, Irving; Dasari, Ramachandra R.; Feld, Michael S.

CS George R. Harrison Spectroscopy Laboratory, Massachusetts Institute of Technology, Cambridge, MA, 02139, USA

SO Journal of Raman Spectroscopy (1998), 29(8), 743-747

AB **Surface-enhanced Raman** scattering (**SERS**) at an extremely high

enhancement level opens up interesting and new spectroscopic possibilities. The effect combines the sensitivity of fluorescence spectroscopy with the high structural information content of **Raman** spectroscopy, and can be used for single mol. detection and identification. This paper reports single mol. detection and identification of nonabsorbing mols. in colloidal Ag solns. using near-IR excited **surface-enhanced** Stokes and **anti-Stokes Raman** scattering. **SERS** enhancement factors of the order of 10^{14} - 10^{15} or, in other words, effective **Raman** cross sections between 10^{-16} and 10^{-15} cm²/mol. result in a significant transfer of ground state population to the 1st excited vibrational state due to the strong **Raman** process. This allows the observation of $v = 1$ to $v = 2$ (hot) vibrational transitions in **SERS** addnl. to $v = 0$ to $v = 1$ transitions normally probed in a **Raman** expt.

L8 ANSWER 90 OF 114 CA COPYRIGHT 2007 ACS on STN

AN 121:216298 CA

TI Experimental observation of **surface-enhanced** coherent **anti-Stokes Raman** scattering

AU Liang, E. J.; Weippert, A.; Funk, J.-M.; Materny, A.; Kiefer, W.

CS Institut fuer Physikalische Chemie, Universitaet Wuerzburg, Marcusstrasse 9-11, Wurzburg, D-97070, Germany

SO Chemical Physics Letters (1994), 227(1-2), 115-20

AB **Surface-enhanced** coherent **anti-Stokes Raman** scattering has been obsd. on colloidal silver surface from benzene, the mixt. of benzene and N,N-dimethylformamide, toluene, and chlorobenzene. Silver colloids which were prepd. in org. solvent N,N-dimethylformamide were used as an enhancement medium. The scattered **CARS** light was collected at right angles with respect to the exciting pump and Stokes laser beams. It was found that not only is the **CARS** signal significantly enhanced but the signal-to-noise ratio is also improved after addn. of the silver sol. An excitation profile study shows a max. enhancement for the benzene-silver sol system located at about 500 nm pump laser wavelength. This is in good accord with the surface plasmon resonance of the system.

L8 ANSWER 109 OF 114 CA COPYRIGHT 2007 ACS on STN

AN 100:182436 CA

TI **Surface enhancement** of coherent **anti-Stokes Raman** scattering by colloidal spheres

AU Chew, H.; Wang, D. S.; Kerker, M.

CS Clarkson Coll. Technol., Potsdam, NY, 13676, USA

SO Journal of the Optical Society of America B: Optical Physics (1984), 1 (1), 56-66

AB **CARS** signals may be strongly enhanced when the active mols. are located near the surface of a small Ag particle. The theor. anal. is similar to the electrodynamic mechanism for **surface-enhanced Raman** scattering, except that there are 4 instead of 2 elec. fields that stimulate collective electron oscillations within the particle. The general anal. is presented for a sphere of arbitrary size, for arbitrary angle between pump and probe beams, and for arbitrary polarization between pump and probe beams. This is then specialized to the small-particle limit for numerical computation. The peak enhancement for a monolayer of C₆H₆ on a Ag particle (excitation wavelength 404 nm, **Raman** shift 992 cm⁻¹) is 10¹² when both incident beams are polarized perpendicular to the

incident plane and 1021 when these beams are cross polarized. These values are averaged over scattering angle. While the **CARS** amplitudes depend on scattering angle, only the enhancement factor for 1 of the cross-polarized components depends on scattering angle. Enhanced signals from a Ag organosol (Ag dispersed in neat benzene) should be measurable.

=> log y

STN INTERNATIONAL LOGOFF AT 16:38:28 ON 16 JUN 2007